

Recent Advances in Betalain Research

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Description

Betalains are a class of yellow and red indole-derived pigments available in clove plants that restore anthocyanin pigments. It occurs in some higher fungi. They are most commonly found in petals, but can discolour the fruits, stems, leaves, and roots of plants that contain them. The deep red colour of beets, amaranth, bougainvillea, and cacti is due to the presence of betalain pigments. The particular shade of red to purple is unique and differs from the anthocyanin pigments found in most plants. Nitrogen dyes. From a nutritional point of view, betalains represent a group of phytochemicals found only to a limited extent in food. Only organisms provide betalains in our diet. However, the use of betalain as a food colouring or the use of betalain-rich plant extracts in functional foods increases the consumption of this type of phytochemical. However, once depleted, new studies will need to be carried out to identify the complete pool of circulating compounds derived from the bio metabolism of betalains. There are Preliminary studies on the biological and health-enhancing properties of betalains have focused on their antioxidant properties through chemical and in vitro antiradical properties. However, their true physiological relevance has not been fully elucidated in human interventions or clinical trials. New studies conducted at relevant physiological concentrations on the effects of betalain and its circulating metabolites suggest that it suggests that these phytochemicals may open new avenues of biological impact on human disease. The colour properties of pigments from *O. stricta*, *O. undulata* and *O. ficus-indica* fruits were studied. The pigment was identified as a betalain based on its visible light spectrum. Both betacyanins and betaxanthins have been identified in the fruits of *O. undulata* and *O. ficus indica*, whereas *O. stricta* contains only betacyanins (betanin and isobetanin). *O. stricta* fruit showed the highest betacyanin content (80 mg per 100 g of fresh fruit). The thermal stability of the pigment extract was pH-dependent, showing maximum stability at pH 5, as expected for betacyanin. At this value and a storage temperature of 4°C, an inactivation half-life of more than 1 year was measured in the absence of added stabilizer. According to these studies, *O. stricta* can certainly be considered as a potential source of natural red pigment. The main research directions of natural plant dyes are their structure elucidation, isolation and analytical methods, biological activity, bioavailability, factors affecting stability, industrial applications as plant foods, natural dyes, pharmaceuticals and cosmetics. This overview describes the past two decades of betacyanin research. The first part of the review article identifies the state-of-the-art classification of all known betacyanins and their derivatives by chemical, mass spectrometry, and NMR techniques. Betalains replace anthocyanins in most Caryophyllaceous flowers and fruits. Surprisingly, they are also found in some higher fungi. Betalains are nitrogen-bearing red and yellow pigments found in caryophyllal plants and some higher fungi. They are responsible for the colours observed in many houseplants and various foods that are used as natural colorants. Their nutritional properties and attractive colours make them attractive targets for metabolic engineering. It is exacerbated by the limited availability of natural sources of betalains due to their relative rarity in the plant kingdom, especially edible plants. Advances in have enabled stable heterologous production of betalains in multiple plant and microbial systems.

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Conflict of Interest

None.

